

**REMARKS/ARGUMENTS**

Claims 29 - 67 (nonelected) are canceled without prejudice to the right of Applicants to include any or all of them in one or more divisional or continuation applications.

Even though the guidelines in the MPEP do not use language mandating that the abstract be one paragraph, but only suggestive language ("should", for example) it has been so amended to remove any such impediment to allowance.

Claims 1, 2, 6, 8, 11, 12 and 23 stand rejected as obvious over Yamaguchi et al.

Applicant submit that in discussing Yamaguchi et al. the examiner has replied to only one of two distinctions made in the previous response, and in addition is not considering the disclosure of the reference as a whole, which is the required approach under 35 U.S.C. 103.

Yamaguchi et al disclose a process for oxidizing alcohols to aldehydes in the presence of oxygen and water, using a catalyst. The present claims contain two major distinctions over Yamaguchi et al. that are essential to Applicants' claimed process but missing in Yamaguchi. These are (a) the type of alcohol involved and (b) the nature of the catalyst.

Yamaguchi et al. is aimed at oxidizing more reactive alcohols to produce carbonyl compounds. The examiner cites a general reaction scheme given in the reference, and then states "Yamaguchi suggest methanol and ethanol with the requisite particularity such that oxidation of these starting materials would be well within the motivation of those of ordinary skill, and thus, prima facie obvious".

However, the formula for the alcohol given in that reaction does not even include methanol, since  $R^1$  must be an aryl, allyl or alkyl group. The formula does encompass ethanol, among a huge host of alcohols, providing that the proper substituents are chosen out of the many available (quite a large number considering that there is no limitation on size of any groups in this formula) but nothing in the remainder of the reference points anyone skilled in the art to consider that ethanol is included in the authors' contemplation. Most of the alcohols in the table have a cyclical moiety as part of the molecule, and all have a much larger and heavier molecule than ethanol. The smallest primary alkanol in that table, and in the entire discussion of the

reference, is n-heptanol, and the smallest overall alkanol is 2-pentanol. There is nothing whatsoever in the disclosure of Yamaguchi et al. to lead one skilled in the art to believe that the authors considered a much smaller molecule such as ethanol to be within the scope of their work. In reaching such a conclusion the examiner can only be relying on hindsight.

Secondly, the catalyst of Yamaguchi et al. is metallic ruthenium, not ruthenium oxide, as claimed. In fact, Yamaguchi et al. specifically state that ruthenium oxide showed no catalytic activity in their work (end of the paragraph in the left hand column on page 4539). In view of that statement, those skilled in the art would not find it obvious to use ruthenium oxide for the oxidation of any alcohols. Yamaguchi et al. specifically teaches away from such an operation.

Applicants respectfully request that this rejection be withdrawn.

Claim 7, which specifies that ethanol is oxidized to produce primarily diethoxyethane, is rejected as obvious over the combination of Yamaguchi et al. with Tanaka et al.

While Tanaka et al. disclose that reaction, the reference teaches a completely different catalyst for it - niobium oxide supported on silica. Applicants have not claimed to be the first to oxidize ethanol to diethoxyethane, but are totally mystified as to how Tanaka et al., which uses a different catalyst than Yamaguchi et al. can be combined with it to find obvious a process that uses neither authors' catalyst but in fact uses a catalyst that the primary reference states was ineffective. Tanaka et al., which uses a different catalyst entirely, does not overcome this specific teaching away of the primary reference.

Applicants respectfully request this rejection be withdrawn.

Claims 1-6, 9-13, 16-29 and 24-28 stand rejected as obvious over JP 65123 in view of Mallat et al.

The examiner makes the same error with respect to JP 65123 as with Yamaguchi et al., namely that they disclose the use of metal catalysts as opposed to ruthenium oxide.

JP 65123 is a little closer than Yamaguchi et al., but nowhere near close enough. This reference does disclose oxidation of methanol (though not ethanol) but uses a catalyst that is a combination of two or more metals and an ion-conducting substance, which in this publication

is a form of carbon. While the reference has a very broad catchall paragraph that states that any metal of groups 3-12 of the Periodic Table can be used, as well as compounds of these metals (including oxides), all of the information in the publication is to the use of combinations of rhodium and iridium with carbon. In view of the fact that the publication asserts improvements over known processes, those skilled in the art would not deduce from the catchall description above that any other type of combination of metallic catalysts would be able to accomplish the same results or, for that matter, work at all. Certainly there would be no basis for selecting ruthenium oxide out of the huge list of metals (the majority of those in the Periodic Table) and types of compounds (thirteen are listed). What this publication discloses to those skilled in the art is that a combination of two metals - specifically rhodium and iridium, together with an ion conductor (carbon is the only one specifically mentioned) is an effective catalyst for this oxidation of methanol - using both oxygen and water. It falls far short of suggesting the use of a supported ruthenium oxide catalyst for oxidation of methanol and/or ethanol with oxygen.

Nonetheless, the examiner asserts that "the use of oxides in catalysts is generally known to those of ordinary skill in the art and JP 65123 merely reflects this by listing the commonly used oxides", and suggests that unexpected results are necessary.

Applicants respectfully disagree with this analysis and with the examiner's conclusion.

This situation is quite similar to that in In re Baird, 29 USPQ2d 1550 (Fed. Cir. 1994). Here, as there, the reference discloses a huge number of possible substances - all metals of groups 3-12 of the Periodic table, as well as all of their halides, nitrates, sulfates, oxides, hydroxides, phosphates, ammonium salts, acetylacetates, carbonyl compounds, alkyl complexes, amine complexes, aryl complexes and/or phosphine complexes, and combinations of these. Out of this huge number of possible compounds, as was the case in Baird, there is no guidance or suggestion whatsoever leading those skilled in the art to choose ruthenium oxide, and no motivation for doing so. The examiner is incorrect; the use of this specific catalyst is not disclosed or even slightly suggested by JP 65123, and no showing of unexpected results is needed.

The examiner seeks to rectify the omissions in JP 65123 by adding Mallat et al. However this reference only emphasizes the distinction made above. It discloses only supported platinum group metals as catalysts, and contains nothing about metal oxides. Mallat, therefore, does not form a combination with JP 65123 that would render the claimed process obvious. At best this combination might make it obvious to use a combination of rhodium and iridium metals supported on alumina, but not a supported catalyst comprising ruthenium oxide.

Claims 14 and 15 are rejected as obvious over the combination of JP 65123, Mallat et al. and Kirk-Othmer, which discloses zeolites as catalyst supports. Applicants certainly do not claim to have discovered that these substances are catalyst supports; however, this does not change the fact that the combination of these three references does not make it obvious to use a supported ruthenium oxide catalyst for the oxidation of methanol and/or ethanol with an oxygen-containing gas.

Appl. No. 10/663,299  
Amdt. dated July 10, 2007  
Reply to Office Action of January 12, 2007

PATENT

Finally, claims 1-5 are rejected as anticipated by Lin et al. Again, this reference shows only a platinum metal catalyst, not any oxide, and does not render any claims anticipated or obvious.

### CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

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